AUTOMATIC RAMAN GAIN AND TILT CONTROL
FOR ULTRA-LONG-DISTANCE DENSE WDM
OPTICAL COMMUNICATION SYSTEMS

ABSTRACT OF THE DISCLOSURE

An approach for automatic Raman gain and tilt control for a WDM (Wavelength Division Multiplexing) optical communication systems is disclosed. An optical fiber carries a plurality of optical signals, in which at least one of the optical signals are reference signals. An optical gain unit (e.g., Raman pump unit) couples to the optical fiber and adjusts the reference signals to compensate, in part, for losses associated with the optical fiber and gain tilt accumulation. Upon detecting and analyzing the reference signals, a controller controls the optical gain unit and outputs a control signal to the optical gain unit based upon the analyzed reference signals. An optical amplifier is connected to the optical fiber and amplifies the optical signals. The optical gain unit provides a nearly constant power per channel at an input of the optical amplifier. Under this approach, a Raman gain control mechanism, combined with the use of gain controlled EDFA (Erbium Doped Fiber Amplifier), allows high transmission capacity over ultra-long distances without optical regeneration and with high flexibility.